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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,871	08/07/2001	Tatsuya Nishimura	2001-1110-A	9174

513 7590 05/04/2004

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EXAMINER	
WILKINS III, HARRY D	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 05/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/890,871	NISHIMURA ET AL.	
	Examiner	Art Unit	
	Harry D Wilkins, III	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *35-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *35-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *032304*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 35 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over So et al (JP 09-215982) in view of Spears (US 5,599,296) and Gilchrist (US 3,798,150).

So et al teach (see abstract and figure) an electrolytic device for electrolyzing water with reducing substances (sewage) at high temperature and pressure, the device containing a reaction cell defining a chamber with a pair of electrodes (1 and 2).

So et al do not teach maintaining the pressure of the influent so that the water of the influent is maintained in a liquid phase.

Spears teaches (see col. 8, lines 33-39) that the formation or growth of bubbles when a gas is dissolved in a liquid can be prevented by increasing the hydrostatic pressure on the liquid.

Therefore, it would have been obvious to one of ordinary skill in the art to have increased the hydrostatic pressure as taught by Spears on the water of the treatment of So et al such that any hydrogen and oxygen produced by the electrolysis reaction were dissolved into the water, thereby avoiding the formation of bubbles and avoiding any explosion hazards.

So et al do not teach that the device had two or more tubular reaction cells having a metal inner well serving as a cathode and an anode is provided in each of the reaction cells.

Gilchrist teaches (see Figs. 6-9 and col. 6, line 33 to col. 7, line 51) a reaction cell system that includes multiple tubular electrolytic cells (72 and 92) that have anodes disposed therein.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the method of So et al to the device of Gilchrist in order to make the treatment method of So et al continuous and to increase the amount of contact area of the waste water with the electrodes as provided for by the tubular electrode set up of Gilchrist (see Gilchrist at col. 2, lines 11-13).

Regarding claim 47, So et al teach (see Example on pages 6-8 of translation) that the method of operating the device was to input water with reducing substances (calcium chloride and sodium bicarbonate) into the device, apply a voltage into the reaction cell at a temperature greater than 100°C (see Table 1), and evacuate the reaction cell to check for scales (solid precipitates) on the cell wall (anode) and cathode. The pressure is inherently kept high enough to ensure the water stayed in liquid form because the electrolytic reaction would not proceed if the water evaporated into a gaseous phase and the hydrostatic pressure to keep the hydrogen gas dissolved in the water, as taught by Spears, is greater than the pressure required to keep the water in liquid form.

3. Claims 41 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over So et al (JP 09-215982) in view of Spears (US 5,599,296) and Stralser (US 3,975,247).

So et al teach (see abstract and figure) an electrolytic device for electrolyzing water with reducing substances (sewage) at high temperature and pressure, the device containing a reaction cell defining a chamber with a pair of electrodes (1 and 2).

So et al do not teach maintaining the pressure of the influent so that the water of the influent is maintained in a liquid phase.

Spears teaches (see col. 8, lines 33-39) that the formation or growth of bubbles when a gas is dissolved in a liquid can be prevented by increasing the hydrostatic pressure on the liquid.

Therefore, it would have been obvious to one of ordinary skill in the art to have increased the hydrostatic pressure as taught by Spears on the water of the treatment of So et al such that any hydrogen and oxygen produced by the electrolysis reaction were dissolved into the water, thereby avoiding the formation of bubbles and avoiding any explosion hazards.

So et al do not teach that the device had two electrodes, each having two or more cylindrical walls as claimed.

Stralser teaches (see Figs. 4 and 5 and col. 6, line 53 to col. 7, line 9) such a device. The first electrode (comprising 26 and 28) had two concentric cylinder walls and the top of the cell connected the two walls to each other. The second electrode (comprising 27 and 29) had two concentric cylinder walls and the bottom of the cell

connected the two walls to each other. The walls are arranged alternating with each other to form a channel for influent between the first electrode walls and the second electrode walls.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the method of So et al to the device of Stralser in order to make the treatment method of So et al continuous and to increase the amount of contact area of the waste water with the cathode and anode to provide higher current emission as provided for by the electrode set up of Stralser (see Stralser at col. 6, lines 53-57).

Regarding claim 52, So et al teach (see Example on pages 6-8 of translation) that the method of operating the device was to input water with reducing substances (calcium chloride and sodium bicarbonate) into the device, apply a voltage into the reaction cell at a temperature greater than 100°C (see Table 1), and evacuate the reaction cell to check for scales (solid precipitates) on the cell wall (anode) and cathode. The pressure is inherently kept high enough to ensure the water stayed in liquid form because the electrolytic reaction would not proceed if the water evaporated into a gaseous phase and the hydrostatic pressure to keep the hydrogen gas dissolved in the water, as taught by Spears, is greater than the pressure required to keep the water in liquid form.

4. Claims 36, 42, 48 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over So et al (JP 09-215982) in view of Spears (US 5,599,296) and either Gilchrist (US 3,798,150) or Stralser (US 3,975,247) as applied to claims 35, 41, 47 and 52 above, and further in view of Yuasa et al (JP 09-117782).

The teachings of So et al in view of Spears and either Gilchrist or Stralser are described above in paragraphs no. 5 and 6. The apparatuses of Gilchrist and Stralser have influent lines and effluent lines for supplying and discharging the water from the reaction cell. It would have been within the expected skill of a routineer in the art to have provided the high hydrostatic pressure, as taught by Spears, through use of a high pressure pump.

However, So et al in view of Spears and either Gilchrist or Stralser do not teach that an oxidizer line is added for supplying an oxidizer to the reaction cell.

Yuasa et al teach (see English abstract) means for treating waste water under high pressure and temperature that includes adding an oxidizer, oxygen, to the reaction chamber for the purpose of facilitating the reaction for the eradication of the waste.

Therefore, it would have been obvious to one of ordinary skill to have added an oxidizer line to the apparatus of So et al in view of Spears and either Gilchrist or Stralser because the oxidizer facilitates the removal of the waste from the water.

5. Claims 37, 43, 49 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over So et al (JP 09-215982) in view of Spears (US 5.599.296) and either Gilchrist (US 3,798,150) or Stralser (US 3,975,247) as applied above to claims 35, 41, 47 and 52 and further in view of Pitora et al (SU 962212).

The teachings of So et al in view of Spears and either Gilchrist or Stralser are described above in paragraphs no. 5 and 6.

So et al in view of Spears and either Gilchrist or Stralser do not teach that conductive particles were added to the influent.

Pitora et al teach (see Derwent abstract) that waste containing organic compounds was treated in a layer of granulated electrically conductive material that was located between two electrodes in a field.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the method of So et al to include the addition of conductive particles as taught by Pitora et al because Pitora et al teach (see Derwent abstract) that the conductive particles provide a higher degree of purification of the waste water and a lower power consumption.

6. Claims 38-40, 44-46, 50, 51, 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over So et al (JP 09-215982) in view of Spears (US 5,599,296), Pitora et al (SU 962212) and either Gilchrist (US 3,798,150) or Stralser (US 3,975,247) as applied to claims 37, 43, 49 and 54 above, and further in view of Hess et al (US 3,652,405).

As above, So et al in view of Spears, Pitora et al and either Gilchrist or Stralser do not expressly teach a separator being used to remove the conductive particles from the effluent stream.

However, because the goal of the process/apparatus of So et al is the purification of water, it would have been obvious to one of ordinary skill in the art to have added means for separating out the conductive particles because they would not be desired in the final pure water product.

A routineer in the art would have looked to conventional means for separating out the conductive particles, such as those disclosed by Hess et al (see figure and col. 2,

lines 42-45) that a slurry (solid particles suspended in a liquid) was separated by means such as a filter or cyclone.

Hess et al teach that the separating means were either a filter or a cyclone. Thus, it would have been obvious to use one of the conventional means disclosed by Hess et al in order to separate out the conductive particles in order to have created a more pure final water effluent.

Response to Arguments

7. Applicant's arguments filed 23 March 2004 have been fully considered but they are not persuasive. Applicant has argued that:

a. Spears is related to only dissolving gas in a liquid after it has been generated, not concerned with preventing the formation of bubbles in the first place.

In response, Applicant admits (see paragraph spanning pages 3 and 4 of response) that the increase in hydrostatic pressure on the liquid limits the formation of bubbles. Thus, Applicant's argument is moot since Applicant admits that the disclosure of Spears does teach that increasing the hydrostatic pressure of a liquid will prevent bubble formation.

b. The Examiner has not provided an explanation as to why increased hydrostatic pressure would result in an increased amount of a gas being dissolved in a liquid.

In response, Spears teaches that increasing the hydrostatic pressure will help prevent the formation of bubbles of gas formed in a reaction. The formation of the

gaseous species continues, regardless of whether or not bubbles are created. Since there is continuously an increase in the amount of the gas in the reactor, and it does not bubble out of solution, there is only one place left for the gas to go, to be dissolved in the liquid. Thus, increased hydrostatic pressure on a liquid increases the amount of gas being dissolved in that liquid.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III
Examiner
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